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(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) **Information Distribution Through a Communication  
Subscription System Utilizing an Interactive Storage and  
Retrieval Device**

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(57) **3 Claims**

Notice: The specification contained herein as filed

**Canada**

CCA 3254 (10-89)

2044574

### Summary Of The Invention

#### Information Sources

An aspect of the present invention is to distribute information from multiple sources such as printed text or graphics or text and graphics. Figure 1 represents the flow of information from source to subscriber. Information from its source is prepared, formatted and delivered in digital (binary) form to a national/regional distributor. The distributor modifies the information to a form compatible with the requirements of the local distributor. The local distributor transmits the modified data to a plurality of subscribers.

## CLAIMS

The embodiments of the present invention in which an exclusive property or privilege is claimed are defined as follows:

1. A process wherein passive or invasive information such as printed text, graphics, text and graphics, or digital text, digital graphics, digital text and graphics, digital audio, digital video or computer animations, is distributed individually or in combination, from singular or multiple sources, to a plurality of subscribers through a communication subscription system.
2. The distribution of information to subscribers using the process described in claim 1 through communication modalities utilizing electronic, telecommunication and antenna technologies intended for radio, television, high definition television, telephone, cellular telephone and other telecommunication applications.
3. A device that forms an integral part of the distribution of information by the process described in claim 1 which contains a computer mother board with: a central processing unit (CPU); system memory; an operating system in read only memory (ROM); and an expansion bus which allows the addition of the following integrated circuit cards:
  - a) a communications card compatible with a communication modality described in claim 2;
  - b) a controller card compatible with an appropriate storage medium;
  - c) a graphics display card which allows information to be displayed on a compatible television or video monitor; and
  - d) input/output (I/O) card that provides ports which interface with the ISR remote control and other devices accessible to the subscriber.
4. Custom software which allows the device described in claim 3 to provide the following functions:
  - a) recognize, decode and download digital information described in claim 1;
  - b) store digital information on a digital storage medium and verify stored information to determine whether additional data must be downloaded on subsequent transmissions;
  - c) provide a user interface by interpreting signals from a remote control via input/out control and displaying sprites and icons; and
  - d) interactively display text, graphics and multi-media information.

5. An optical scanning infrared remote control which allows the subscriber to interface with the device described in claim 3. The remote control contains the following components:
- a) alphanumeric and functions keys;
  - b) an optical scanner which determines the position of the pointer on the video display; and
  - c) an infrared transmitter which relays information from the optical scanner and alphanumeric or function keys.

# **INFORMATION DISTRIBUTION THROUGH A COMMUNICATION SUBSCRIPTION SYSTEM UTILIZING AN INTERACTIVE STORAGE AND RETRIEVAL DEVICE**

## **Patents Referenced**

Canada Patents	1,266,535	Mar/90	Cl. 350-25	Lucas
	1,273,103	Aug/90	Cl. 350-25	Fausone
	1,156,753	Nov/83	Cl. 350-25	Guillou
	1,278,370	Dec/90	Cl. 350-25	Wiedmer
	1,216,932	Jan/87	Cl. 350-25	Lovett
	1,258,648	Jul/91	Cl. 350-20	Johnson
	1,033,052	Jun/78	Cl. 350-11	Vieri
	1,134,496	Oct/82	Cl. 350-4	Wessler
	1,145,031	Apr/83	Cl. 350-11	Keyt
	1,175,934	Oct/84	Cl. 350-4	Oya
	1,189,950	Jul/85	Cl. 350-4	Bushaw
	1,228,666	Oct/87	Cl. 350-4	Yoshimoto
United States Patents	4,695,880	Sep/87	Cl. 358-86	Johnson
	4,855,725	Aug/89	Cl. 340-307	Fernandez

## **Background of the Invention**

Electronic information dissemination has grown in recent years. Improvements have been made in personal voice and data communication. Existing communications networks have grown to provide personalized data to virtually anywhere. Numerous devices and concepts have been incorporated to improve personal communication and data transmission. New information modalities such as facsimile and pay-per-view television incorporate existing communication technologies.

Johnson et al, Canada patent 1,285,648 and United States Patent 4,695,880 describe an electronic information dissemination system which electronically distributes information such as bulk mailed letters, bills and other information from one or more sources to each of a plurality of remote stations located in homes or businesses.

Fernandez, United States patent 4,855,725, describes a microprocessor based simulated book that is a remote display device in which a computer transmits data to the device via an infrared interface. The "book" has memory and an operating system which displays "pages" of information on the screen and interfaces with the computer.

Information distribution inherently takes one of two forms, "passive" or "invasive". A passive information distribution system is mutually exclusive, meaning the user ultimately has control of the information received. This type of system is best suited for a subscriber based distribution system in which users only subscribe to the type of

information they wish to receive.

An invasive information distribution system is mutually inclusive, meaning the user always receives the information regardless of whether they want to or not. This is the information dissemination system described by Johnson which is essentially an electronic mail/facsimile system.

### **Summary of the Invention**

The invention described herein is a multi-service information distribution system in which printed or digital information in the form of text, graphics, text and graphics, digital audio and computer animation may be transmitted in digital (binary) form to a plurality of subscribers. The information may be invasive, designed for a single or group of subscribers, or passive which subscribers have chosen to receive.

The digital (binary) data may be transmitted to subscribers via a number of communication modalities utilizing electronic, telecommunication and antenna technologies used for radio, television, high definition television, telephone, cellular telephone and other telecommunication applications. The distribution of data will conform with established industry and government standards and protocols.

Although the information distribution system described in this invention may be invasive as the information dissemination system described by Johnson, the format of the information is different. In Johnson's invention, information is sent to the remote station in two distinct separate data sets referred to as "global" and "personalized". Global information is common to all receiver/decoders while personalized is unique to only one. The global and personalized data is received separately by the receiver/decoder, is then combined by the receiver/decoder and then a hard copy is made by the receiver/printer. The system is limited to text and graphics such as logos etc.

In this invention the information is combined and formatted into distinct "packages" prior to transmission. The packages may contain, but are not limited to, text and graphics such as may be found in letters, bills, postcards, etc., as in Johnson's invention. They may also contain audio or video messages such as in voice or video mail, not contained in Johnson's invention. For example: by combining text and graphics, information may be formatted as digital newspapers, magazines or books; and by combining digital audio, digital video, and computer animation with text and graphics, information can then be formatted as multi-media presentations. The information package may also be distributed in singular form such as text only, graphics only, audio or video only, etc. Examples of services provided include: educational or entertainment multi-media packages, digital audio and/or video for members of a music/video club or computer games and graphics.

The electronic information is received by subscribers via an Interactive Storage and Retrieval (ISR) device. The ISR is an integral part of this invention as is the receiver/decoder/printer in Johnson's invention. Unlike Johnson's device the ISR uses

industry standard components. ISR components include a commercially available computer mother board with a central processing unit (CPU) and a multi-tasking operating system in read only memory (ROM). The motherboard allows expansion via an expansion bus using industry standard computer components available on integrated circuit cards. A communications card such as a modem modified for communication modality, allows the ISR to interface with the distribution system. Video display is handled via a video display card in the expansion bus. Serial input/output (I/O) ports presently used for such devices as a mouse or joy stick, can be used to interface the optical scanning infrared remote control. This remote control combines components found in a device such as an optical scanning video gun used in popular video games with an infrared mouse or remote control. The remote control optically scans the raster lines on the video display to determine where the user is pointing the remote control and displays a pointer at that location. The remote control has buttons which when pressed, will relay information to the ISR operating system. Standard I/O ports also allow the ISR to interface with other devices such as portable display units and printers not contained in this invention, but which subscribers may have access to.

In addition to receiving and processing the incoming data, the ISR also stores it on a digital storage medium. The optical/infrared remote control allows the subscriber to retrieve, interactively manipulate and display stored information on a television, high definition television or video monitor. In addition to displaying text and graphics the ISR can function as a multi-media presentation unit. It has the ability through custom software, to play digital audio sound tracks or digital video sequences.

The ISR has four display modes; text, graphics, audio/video (AV) and multi-media. The display mode is dependent on what type of information package is selected. For example, if the information is text only, the ISR will go into text mode. If the information is graphics the ISR will go into graphics mode. If the information is digital audio or digital video, the ISR will go into AV mode. If the package contains combined information such as text and graphics as in a digital newspaper, it will enter multi-media mode. Each of the display modes serves a particular purpose and has specific functions.

The text mode allows the reader to read the text files associated with the information package. The text information is displayed one screen at a time. "Next screen" and "previous screen" functions also allow the user to scroll forwards and backwards through the text. The exit function returns the user to the main screen if the information package is text only or to multi-media mode at the previously displayed screen, if it is multi-media.

The graphics mode displays full screen graphics. This mode has "next screen" and "previous screen" functions which allow the user to scroll forwards and backwards through the graphics. The "exit" function returns the user to the main screen if the information package is graphics only or to multi-media mode at the previously displayed screen, if it is multi-media.

The AV mode provides functions similar to those of AV tape player. It has "play", "stop", "rewind", "fast forward", and "exit" functions. The exit function returns the user to the main

screen if the information is AV only, or to multi-media mode at the previously displayed screen if it is multi-media.

The multi-media mode allows the user to browse through the information package one screen at a time and select the article they wish to view. The functions this mode provides are: "next screen", "previous screen" and "exit". Next screen and previous screen allow the user to browse forward and backward through the screens or to select a specific screen by inputting its number using the alphanumeric keypad on the remote control.

When in multi-media mode all other ISR display modes are independent of each other and the information stays resident in memory until a new article is selected. This allows the user to switch between display modes by depressing the appropriate function button, without having to wait for the information to reload.

One service to which this invention is well suited, is the distribution of an electronic newspaper via a local CATV channel on a national CATV network.

A typical newspaper is arranged into multiple sections with multiple pages each containing multiple articles. Articles usually contain titles and subtitles, graphics and text. An electronic newspaper is formatted in a similar manner with multiple sections containing multiple pages. Each page contains articles which are arranged into blocks and may have other files such as text and graphics files associated with it. Each electronic newspaper has an identification (ID) code which identifies the publication, issue, volume number, date, etc. It also has a file header which identifies the number of sections, their sequence and the number of pages in each section. Each page also has a header which identifies the articles on that page, the x,y coordinates of the top left and bottom right of the article block and other files associated with the article.

The ISR is programmed to recognize the publication code. In standby mode the ISR monitors the CATV channel for the ID code of the electronic newspaper. When the code is recognized the paper is downloaded. The ISR then checks the downloaded data against a standard file format for errors or missing data. If the data is intact the ISR returns to standby mode. If the data is not intact, the error checking routine determines which data is corrupt, deletes it and downloads the missing data on a subsequent transmission.

The user activates the ISR using the remote control and selects an information package by moving the pointer on the screen over an icon and pressing a button on the remote control. The ISR then loads the information and enters the multi-media mode. In this mode pages of the newspaper are graphically represented as pages on the display monitor. Most hardcopy newspapers are folded in the middle. A half-page is about the same size as a 20 inch T.V. screen. Therefore, one logical method to display hardcopy newspapers faithfully in electronic form would be page 1, top; page 1, bottom; page 2; top; page 2; bottom, etc. At common viewing distances between 2-3 meters, the graphics may be hard to distinguish and the text illegible. Therefore a graphics mode is



used to zoom the graphics in the article to full screen and a text mode is used to read the associated text.

The subscriber can browse through the paper in multi-media mode by pressing the next or previous page (screen) keys on the remote control, or can enter a page number using the alphanumeric keys. They can select an article by using the remote control to move a pointer over the article block. When a display button is pushed on the remote control, the operating system determines the x,y coordinates of the pointer, checks the page header to determine which article has been chosen and determines the type and ID of file the user wishes to view. For example, if the graphics button is pressed, the operating system will display the graphics associated with the article. This is a full screen representation of the graphics contained in the article and in effect acts as a zoom feature. If there are other graphics associated with the article, they can be selected by the next screen on the remote control. The previous screen function allows the user to view previously viewed graphics. Pressing the exit button returns the subscriber to the multi-media mode at the current page. If the text button is pressed, the ISR will display the text in text reader. The subscriber will have control over the text display with next screen and previous screen buttons on the remote control. The exit button will return the subscriber to multi-media mode at the last page previously displayed.

The subscriber is able to move between the two display modes by pressing the appropriate function button on the remote control; thereby, having access to both text and graphics for comparison. When the reader returns to multi-media mode, they can browse through the rest of the paper, forwards or backwards, one page at a time. If they wish to select another article on the same page or on a different page, they follow the same steps described above. The reader also has the option to move from one page to another by entering the page number they wish to view on the numeric keypad on the remote control.

Reformatting the paper for electronic distribution would greatly improve the displaying of the information. An article typically includes a large type face title and smaller subtitles, pictures and text. At typical viewing distances between 2-3 meters, titles and subtitles are easy to read, graphics may be difficult to distinguish and text illegible. Therefore only titles and graphics need to be displayed in browse mode. This will reduce the size of the newspaper and still maintain information quality.

## **Description of the Invention**

An aspect of the present invention is to distribute to a plurality of subscribers, information such as:

printed or digital text, graphics or text and graphics presently taking the form of newspapers, magazines, journals, periodicals, advertising and books;

printed or digital text, presently taking the form of directories, microfiche and

microfilm; and

digital audio, digital video and animation presently taking the form of audio and video recordings, radio or television advertising and promotion and computer graphics and games.

An aspect of the present invention is the information may take the form of invasive information intended for a single subscriber or group of subscribers, or passive information which the subscriber may choose from a selection of information packages. Both types of information use the same distribution method illustrated in figure 1. Information from its source is prepared, formatted and delivered in digital (binary) form to a regional or national distributor. The regional or national distributor may modify the information to a form compatible with the requirements of the local distributor. The local distributor transmits the modified data to a plurality of subscribers. Information packages are transmitted on a continuous basis following a standardized time frame allowing for retransmission of specific data numerous times.

An aspect of the present invention is the information distribution will conform to existing and future data communication standards and protocols such as:

coaxial cable transmission systems applied to the specialized transmission of electronic audio and video information;

fibre optic cable systems which may transmit electromagnetic radiation within the carrier wavelength region from 400 nanometres to 3 millimetres;

telephone cable systems applied to the transmission of digital or analog information in electronic form from one telephone to another;

electromagnetic waves including microwave transmission by earth microwave relay stations for regional subscribers or by earth satellite transmission for national and international distribution; and

any one of the recognized communication frequency bands utilizing electronic, telecommunication and antenna technology currently used for radio, television, high definition television, telephone, cellular telephone and other telecommunication applications.

An aspect of the present invention is to transmit digital data in files representing information "packages". Each information package contains all the necessary files for the presentation software of the ISR. Packages which contain only one type of data such as text or audio only, may be transmitted in one large file. However, multi-media packages may be separated into multiple files. For example, an electronic newspaper package may be divided into sections. Each section may contain a number of pages and each page may contain articles. Each article may have other files associated with it, such as text, graphics, digital audio or digital video.

An aspect of the present invention is to assign a unique identification code to each form of electronic information material available to subscribers. This code identifies the information as to type, ie passive or invasive and content, ie text, graphics, audio, video or multi-media. This code is transmitted preceding transmission of the publication. Each information package has a data header containing a unique code which identifies: the publication's name, issue, volume number and date. The data header format is dependent on the type of information package and may contain additional information. For example, a digital newspaper will have a unique code identifying the publisher, the issue, the date of publication, the number of sections and the number of pages. Each section also contain a section header which contains information regarding the number of pages and their sequence. Each page has a page header which contains information regarding the number of articles, the x,y coordinates of the article blocks and the files associated with each article.

An aspect of the present invention is that subscribers require an Information Storage and Retrieval (ISR) device located in their place of residence or business that receives the modified digital data. The ISR construction incorporates a commercially available computer mother board with a central processing unit (CPU); a multi-tasking operating system in read only memory (ROM); and an expansion bus. Industry standard computer components available on integrated circuit cards provide communications system interface; video display; I/O control; and a remote control interface. The ISR expansion bus also allows for system upgrades such as: a faster CPU; more memory; improved video display; improved communications, etc. The standard I/O port will allow the ISR to interface with other devices, such as printers or portable display devices. The components of an ISR are illustrated in figure 2.

An aspect of the present invention is that the ISR continually scans the transmitted data searching for identification codes that it recognizes. These codes are programmed into the ISR system software and correspond to specific publications. Each ISR is independently programmed to recognize any of the publication codes selected, allowing for a variety of subscriber options. Upon recognition of the publication identification code, the ISR downloads, processes and stores the binary data on a digital storage medium such as floppy disk, hard disk, removable hard disk, floptical disk or erasable writable magneto-optical disk. The ISR verifies the stored data by checking the file header data blocks against a standard file header format. If one or more files of data are corrupted, the ISR will erase the corrupted data from the storage medium. It will then determine what sections are missing and download them in subsequent transmissions. The ISR will only download missing data files, maintaining previously stored data integrity. Files received in subsequent transmissions will be checked for errors using the same procedure and the process will continue until all data is received and verified or there are no more subsequent transmissions. Once the system receives all the data and data integrity is verified, the ISR will return to standby mode awaiting activation by the subscriber. If after multiple attempts to receive all digital data, sections are missing, the ISR will inform the subscriber that data is missing and display all available data sections in logical sequence. The ISR storage logic is illustrated in figure 3.

An aspect of the present invention is to provide a remote control interface using standard I/O ports such as those used for a mouse or joy stick. The remote control is a multi-function device which incorporates; alphanumeric keypad; special function keys; and optical scanner; and an infrared transmitter to relay information to the ISR. The user points the remote control at the video display which optically scans the raster lines. The infrared transmitter sends signals to the operating system which are interpreted as cartesian x,y coordinates on the television screen. The operating system displays a sprite representing a pointer, on the television screen at these coordinates. By continually tracking and redisplaying the sprite, the ISR allows the subscriber to effectively move the pointer on the television or video monitor screen. The infrared transmitter also relays information to the operating system when function or alphanumeric keys are pressed.

An aspect of the present invention is that when the ISR is activated by the subscriber, it retrieves and interactively displays the stored information on a television or video monitor. Information packages are represented as icons on the main display screen. The user selects the package they wish to view by moving the pointer on the screen over the icon and depressing a function button. The operating system determines the type of information package the icon represents from information contained in the icon and the appropriate ISR display mode is selected. For example, if the information is text only, text mode is selected. If the information package is audio or video, AV mode is selected. If the information package is an electronic newspaper or magazine, multi-media mode is selected.

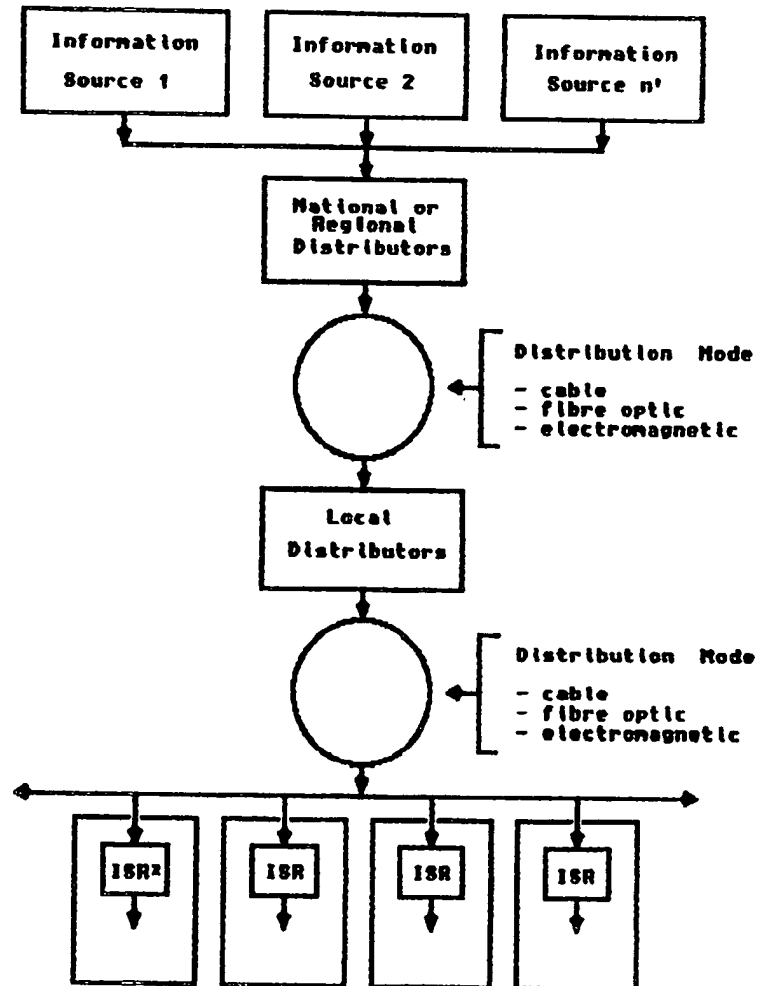
In text mode, the ISR displays text information one screen at a time. Next and previous screen functions allow the user to interactively scroll forwards or backwards through the text. An exit function returns the ISR to the main screen if the information package is text only, or into multi-media mode if it is multi-media.

In graphics mode, the ISR displays graphics one screen at a time. Next and previous screen functions allow the user to interactively scroll forwards and backwards through the text. An exit function returns the ISR to the main screen if the information package is graphics only, or into multi-media mode if it is multi-media.

In AV mode, the ISR emulates an AV tape player. The user has control over the player with play, pause, fast forward, rewind, stop and exit functions. The exit function returns the user to the main screen if the information package is AV only or to the multi-media mode if it is multi-media.

In multi-media mode, the ISR displays multi-media screens one screen at a time. Next and previous screen functions allow the user to interactively scroll forwards and backwards through the multi-media screens. A screen may be randomly selected using the alphanumeric keypad, on the remote control. Articles are selected by moving the pointer over the article and pressing either the text, graphics or AV function buttons. The file associated with the article is then displayed in the appropriate display mode. An exit function returns the ISR to the main screen where another information package maybe selected. The ISR's remote control and display logic are illustrated in figures 4 and 5.

**Figure 1**      **INFORMATION DISTRIBUTION THROUGH A  
COMMUNICATION SUBSCRIPTION SYSTEM**

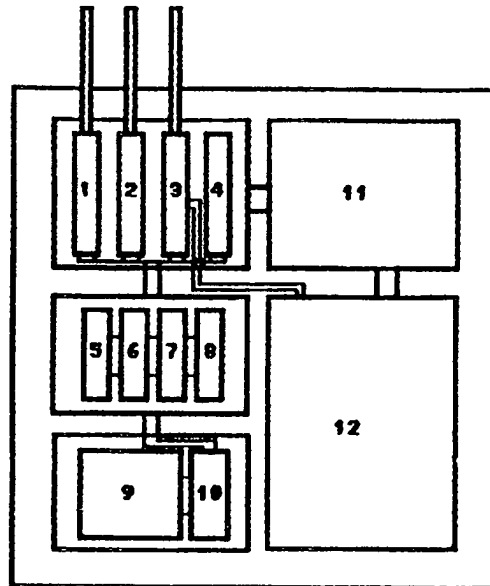


**Legend**

- 1 n= n'th information source
- 2 ISR= interactive storage and retrieval device

**Figure 2**

**INTERACTIVE STORAGE AND RETRIEVAL DEVICE**



**Legend**

**1-4: Expansion Bus \***

communication card  
video display card  
audio card  
expansion memory

**5-8: Central Processing Unit**

microprocessor  
co-processor  
operating system (ROM)  
I/O control

**9-10: Remote Control Interface**

**11: Power Supply**

**12: Storage Device**

\* may include more than 4 expansion slots

Figure 3

ISR DEVICE LOGIC

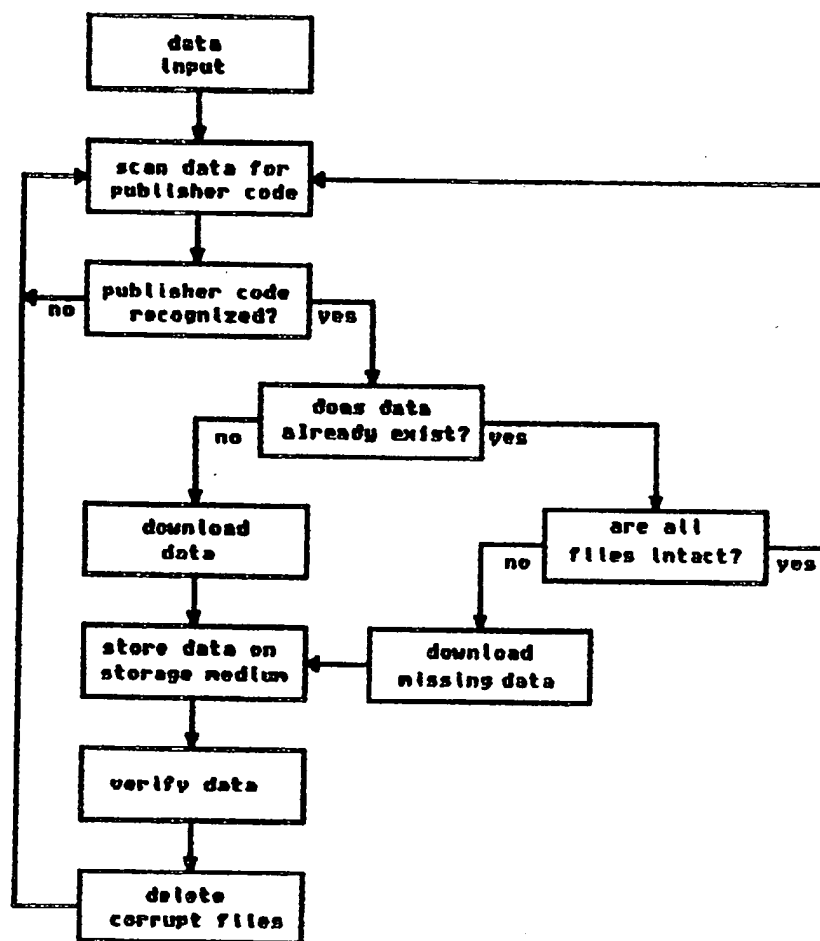
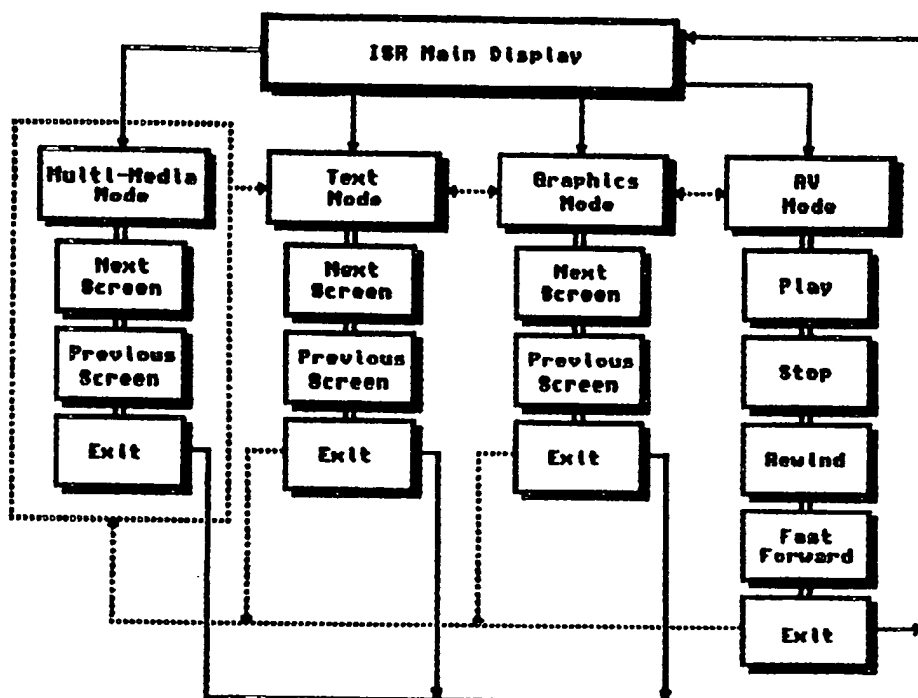


Figure 4

ISR INTERACTIVE REMOTE CONTROL LOGIC





**Figure 5**

**ISR DISPLAY LOGIC**

